

## El Nino/La Nina Local Climate Study

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A study of the 11 strongest El Nino and La Nina winters since 1950, and their effect on Glasgow temperature and precipitation was made. The El Ninos were ranked by their strength as determined by peak temperature departures from normal that were reached in the 3.4 region of the Equatorial Pacific, as obtained from CPC. All were of moderate or strong intensity according to CPC definition. (at least 1.0C departure.)

Note the strong correlation between the El Nino and Glasgow season temperature and precipitation departures. In the winter (DJF) the average temperature is well above normal. The 1965-66 winter and the 2009-10 winters stand out as anomalies, On occasion, even moderate or strong El Ninos can be overwhelmed by other large scale oscillations of other circulation patterns. The El Nino influence showed very well in the Spring (MAM) as well, with possible slight influence extending through the summer( JJA) and into the following fall (SON).

La Nina showed the opposite correlations Of El Nino in both temperature and precipitation. The temperature correlation appears not quite as strong compared to El Nino. Similar to El Nino, indications were that La Nina influence also extended into at the least the spring and summer seasons. Note that the summer following a La Nina is wet, but so is the Summer followed an El Nino.

In conclusion, a moderate or strong El Nino or La Nina is a reliable indicator of what the winter and spring seasons will bring. However, these can be overwhelmed by other strong long-term oscillations and circulations such as the NAO, AO, PNA, and MJO.

**Table 1.** Spreadsheet for El Nino data.

STRENGTH	SEASON	DJF	DEPART	MAM	DEPART	JJA	DEPART	SON	DEPART
2.5	97-98	23.0	7.8	44.4	1.6	69.3	1.2	48.6	4.8
2.3	82-83	22.2	7.0	42.8	0	70.6	2.5	45.3	1.5
2.1	72-73	16	0.8	45.6	2.8	69.4	1.3	42.4	-1.4
1.8	91-92	18.2	3	47.9	5.1	65.1	-3.0	44.9	1.1
1.8	2009-10	9.2	-6	48.0	0.2	67.4	-0.7	43.5	-0.3
1.7	87-88	17.9	2.7	48.4	5.6	73.6	5.5	44.6	0.8
1.6	65-66	9.8	-5.4	41.7	-1.1	66.4	-1.7	44.0	0.2
1.6	57-58	22.3	7.1	44.6	1.8	66.8	-1.3	44.0	0.2
1.5	2002-03	18.3	3.1	42.9	0.1	71.2	3.1	42.5	-1.3
1.3	86-87	26.6	11.4	48.4	5.6	67.7	-0.4	47.4	3.6
1.3	94-95	19.5	4.3	40.2	-2.6	67.6	-0.5	38.9	-4.9
TOTALS		18.8	3.6	44.5	2.7	68.6	0.5	44.3	0.5

STRENGTH	SEASON	DJF	DEPART	MAM	DEPART	JJA	DEPART	SON	DEPART
2.5	97-98	0.42	-0.56	3.17	0.23	5.99	0.76	4.65	2.57
2.3	82-83	1.45	0.47	2.08	-0.86	3.42	-1.81	1.37	-0.71
2.1	72-73	0.70	-0.28	2.05	-0.89	6.15	0.92	2.13	0.05
1.8	91-92	0.44	-0.54	1.51	-1.43	5.40	0.17	1.80	-0.28
1.8	2009-10	1.05	0.07	5.05	2.21	8.43	3.20	2.41	0.33
1.7	87-88	0.72	-0.26	1.88	-1.06	3.29	-1.94	1.20	-0.88
1.6	65-66	0.77	-0.21	2.60	-0.34	7.67	2.44	1.43	-0.65
1.6	57-58	0.53	0.45	0.90	-2.04	3.73	-2.50	1.70	-0.38
1.5	2002-03	0.55	-0.43	3.38	0.46	4.29	-1.94	1.78	-0.30
1.3	86-87	0.29	-0.67	3.45	0.51	4.85	-0.38	0.72	-1.36
1.3	94-95	0.44	-0.54	3.08	0.14	7.85	2.62	1.55	-0.53
TOTALS		0.67	-0.31	2.65	-0.29	5.55	0.32	1.85	-0.23

**Table 2. Spreadsheet for La Nina data**

STRENGTH	SEASON	DJF	DEPART	MAM	DEPART	JJA	DEPART	SON	DEPART
-2.0	55-56	7.9	-7.3	40.0	-2.8	67.8	-0.3	46.0	2.2
-2.0	73-74	17.2	2.0	42.6	-0.2	67.8	-0.3	45.9	2.1
-2.0	88-89	12.3	-2.9	40.6	-2.2	67.0	-1.1	45.3	1.3
-1.7	49-50	2.5	-12.7	37.1	-5.7	65.3	-2.8	43.4	-0.6
-1.7	75-76	20.6	5.4	45.1	2.3	67.6	-0.5	42.8	-1.2
-1.6	98-99	18.8	3.6	44.5	1.7	67.0	-1.1	46.9	2.7
-1.6	99-00	22.7	7.5	45.5	2.7	68.0	0.1	40.8	-3.2
-1.4	2007-08	16.2	0.7	42.7	0.1	67.5	-0.6	45.7	1.7
-1.4	70-71	10.5	-4.7	40.8	-1.0	70.3	2.2	44.4	0.4
-1.1	64-65	6.3	-8.9	35.2	-7.6	67.4	-0.7	42.4	-1.6
-1.1	84-85	10.1	-5.1	47.0	4.2	65.8	-2.3	34.4	-9.6
TOTALS		13.2	-2.0	42.0	-0.8	67.4	-0.7	43.2	-0.8
STRENGTH	SEASON	DJF	DEPART	MAM	DEPART	JJA	DEPART	SON	DEPART
-2.0	55-56	1.06	0.08	2.49	-0.45	5.33	0.10	0.51	-1.57
-2.0	73-74	1.21	0.23	4.69	1.75	7.00	1.77	0.75	-1.33
-2.0	88-89	1.65	0.67	4.07	1.13	3.38	-1.85	1.28	-0.80
-1.7	49-50	3.33	2.35	2.80	-0.14	9.76	4.53	4.28	2.20
-1.7	75-76	0.78	-0.20	1.54	-1.40	10.43	5.20	0.95	-1.13
-1.6	98-99	1.45	0.47	4.88	1.94	5.99	0.76	1.83	-0.25
-1.6	99-00	0.68	-0.30	4.15	1.21	6.65	1.40	2.53	0.45
-1.4	2007-08	0.85	-0.13	4.58	1.64	5.88	0.65	3.21	1.13
-1.4	70-71	1.46	0.48	1.60	-1.34	2.24	-2.99	1.60	-0.48
-1.1	64-65	1.44	0.46	4.06	1.12	8.56	3.33	0.91	-1.17
-1.1	84-85	0.65	-0.32	3.52	0.58	6.52	1.29	2.21	0.13
TOTALS		1.32	0.34	3.22	0.28	6.52	1.29	1.82	-0.26